

REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-11, 13-19, and 21-38 are currently pending, with Claims 14-19, 21, and 33-38 being withdrawn as directed to non-elected inventions. Claims 1 and 22 have been amended by the present amendment. The changes to the claims are supported by the originally filed specification and do not add new matter.

In the outstanding Office Action, Claims 1-11, 13, and 22-32 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 7,263,214 to Uppaluri et al. (hereinafter the ‘214 patent”) in view of U.S. Patent No. 7,403,646 to Sato (hereinafter “the ‘646 patent”).

Applicants wish to thank the Examiner for the interview granted Applicants’ representative on December 1, 2010, at which time a proposed amendment to the claims was discussed. In particular, Claims 1 and 22 were discussed. At the conclusion of the interview, the Examiner indicated that the proposed amendment would likely overcome the outstanding rejection of the claims, but that further consideration of the ‘214 patent would be required upon formal submission of a response to the outstanding Office Action.

Amended Claim 1 is directed to a method, comprising:

obtaining a temporal subtraction image of an anatomical region of a patient from two images taken at respective times separated by a time interval that is long enough to allow for pathological change in the anatomical region;

extracting at least one feature from the subtraction image;

classifying a region of interest in the subtraction image as one of (1) a misregistration or motion artifact, and (2) an abnormality associated with said pathological change, based on the extracted at least one feature by inputting the at least one feature into an automated classifier; and

displaying a computer-aided diagnostic symbol indicating a location of a region representing said pathologic change on at least one of the temporal subtraction image and the two images.

The changes to Claim 1 are supported by the originally filed specification and do not add new matter.

Applicants respectfully submit that the rejection of Claim 1 under 35 U.S.C. § 103(a) is rendered moot by the present amendment to that claim.

Regarding the rejection of Claim 1 under 35 U.S.C. § 103(a), the Office Action asserts that the '214 patent discloses everything in Claim 1 with the exception of the "... symbol display, shift vector processing or setting specific break values for gray-level processing,"¹ and relies on the '646 patent to remedy those deficiencies.

The '214 patent is directed to a method for computer-aided processing of dual or multiple energy images including steps of obtaining a dual or multiple energy image data set, defining a region of interest within an image from the dual or multiple energy image set, extracting a set of feature measures from the region of interest, and reporting the feature measures on the region of interest. As noted by the outstanding Office Action, Figure 2 of the '214 patent is directed to a flowchart of an image acquisition and processing method that includes steps of image acquisition, pre-processing, decomposition, post-processing, and presentation. Further, the '214 patent discloses that the pre-processing step 20, which is shown in detail in Figure 4, includes a registration/motion correction step 26. In particular, the '214 patent discloses that, in step 26, registration is performed to reduce motion artifacts by correcting for motion and aligning anatomies between the high- and low-energy images.² Further, the '214 patent discloses that, in the decomposition step 30, edge information and/or

¹ See page 3 of the outstanding Office Action.

² See '214 patent, column 3, lines 51-61.

artifact location information can be derived from decomposed images for use in the registration/motion correction.

However, Applicants respectfully submit that the '214 patent fails to disclose the step of classifying a region of interest in the subtraction image as one of (1) a misregistration or motion artifact, and (2) an abnormality associated with the pathological change, based on the extracting of at least one feature, by inputting at least one feature into an automated classifier, as recited in amended Claim 1.

In this regard, Applicants note that the '214 patent discloses a classification part 240 that is used to classify regions of interest 220 into benign or malignant nodules, classifications, fractures or metastases classification, or whatever classifications are employed for the particular medical condition involved.³ Further, the '214 patent discloses that the classification is performed based on features such as shape, size, density, gradient, edges, and texture that are computed and optimally extracted by the feature extraction unit 230.

However, Applicants respectfully submit that the result of the classification 240 is not whether the region of interest is one of (1) a misregistration or motion artifact, and (2) an abnormality associated with pathological change, as required by amended Claim 1.

In this regard, Applicants note that the disclosure in the '214 patent regarding the performance of registration to reduce motion artifacts is completely and totally unrelated to the classifier 240. The disclosure in the '214 patent regarding motion artifacts and registration is in the context of trying to figure out how to create a better energy subtraction image or doing a better job of registering the two images before subtracting them. As clearly shown in '214 patent Figure 6, the registration is performed in step 210, in which various images are obtained. Following that, in steps 220-240, classification is performed using

³ See Figure 6, as well as column 6, lines 35-42.

various features such as shape, size, and density. However, Applicants respectfully submit that neither the inputs nor the outputs to the classification unit 240 have anything to do with motion or misregistration artifacts, contrary to the requirements of amended Claim 1.

Further, Applicants note that Claim 1 recites obtaining a temporal subtraction image of an anatomical region of a patient from two images taken at respective times separated by a time interval that is long enough to allow for pathological change in the anatomical region. However, Applicants note that the '214 patent merely discloses obtaining low-energy, high-energy, soft-tissue, and bone images, which are different from the temporal subtraction images recited in Claim 1.

Applicants respectfully submit that the '646 patent fails to remedy the deficiencies of the '214 patent, as discussed above. In particular, the '646 patent is directed to an image processing method for generating a difference image from a first radiographic image and a second radiographic image. In particular, Applicants note that the Office Action relies on the diagnostic symbol display shown in Figures 1-6. However, Applicants respectfully submit that the '646 patent fails to disclose the step of classifying a region of interest in the subtraction image as one of (1) a misregistration or motion artifact, and (2) an abnormality associated with pathological change, based on the extracted at least one feature, by inputting the at least one feature into an automated classifier, as required by amended Claim 1.

Thus, no matter how the teachings of the '214 and '646 patents are combined, the combination does not teach or suggest the classifying step recited in amended Claim 1. Accordingly, for the reasons stated above, Applicants respectfully submit that the rejection of Claim 1 (and all associated dependent claims) is rendered moot by the present amendment to Claim 1.

Independent Claim 22 recites limitations analogous to the limitations recited in Claim 1, and has been amended in a manner analogous to the amendment to Claim 1. Accordingly,

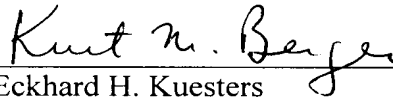
for the reasons stated above, Applicants respectfully submit that the rejection of Claim 22 (and all associated dependent claims) is rendered moot by the present amendment to Claim 22.

Thus, it is respectfully submitted that independent Claims 1, 13, and 22 (and all associated dependent claims) patentably define over any proper combination of the '214 and '646 patents.

Consequently, in view of the present amendment and in light of the above discussion, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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